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# Ain't Gonna Study War No More: Teaching and Learning Cooperation in a Graduate Course in Resource and Environmental Management

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# Ain't Gonna Study War No More: Teaching and Learning Cooperation in a Graduate Course in Resource and Environmental Management

John R. Welch <sup>α</sup> & Evelyn Pinkerton <sup>ο</sup>

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## I. INTRODUCTION

It is not the similarity or dissimilarity of individuals that constitutes a group, but interdependence of fate.' Kurt Z. Lewin, 1939

It has been a half century since the publication of *Cooperation in Change* (1963), Ward Goodenough's landmark book on applications of social science in regional and international development. During the same period, and especially since 1990, there has been a proliferation, across North American and internationally, of programs in environmental science, studies, and management for undergraduate, graduate and post-graduate learners (Clark et al., 2011a; McGowan, 2004; Zurayk et al., 2010). Perhaps because of the breath of the field of resource and environmental management and the diversity of the contributing academic specializations, there is little consensus or convergence on preferred curricular orientations or trajectories (White and Mayo, 2005:33). Some faculty

have advocated for course and program emphases on negotiation and dialogue (Ness and Williams 2008; Suskind, 2000), on human dignity and environmental justice (Clark et al., 2011b; Washington and Strong, 1997), on sustainability (White, 2002), on environmental ethics (Martin and Beatley, 1993), on experiential learning (Wagner et al., 2012), on applied knowledge and action research (White and Mayo 2005), or on inter- and trans-disciplinary approaches (Focht and Henderson, 2009; Maniates and Whisse, 2000; Moslemi et al., 2009; Winner and Champion, 2012).

These are all important topics and compelling pedagogical and curricular orientations, of course, though a fundamental question remains: are we, and other faculty members working at the interfaces of environmental and resource management training, research, and outreach, part of the solution or contributors to the 'institutional failure in resource management' invoked by Acheson (2006)? Our answer is that it depends less on what we (or others) consider to be true today than on what our students learn and, more importantly, what they do with their learning after departing our classrooms and programs.

As academic processes unfold, relentless change at global and lesser scales seems to be outstripping efforts to create resilient human ecosystems. Losses in biodiversity and ecosystem service capacities show that humans are making our planet more toxic, more climatically variable, and generally riskier and less hospitable to human and non-human communities (UNEP, 2012a). Even as we lament the likelihood that future generations will have to make up for our apparent failure to establish effective institutions and sustainable societies, we are committed to doing what we can right now. We offer our thoughts and practices as part of a still-emerging dialogue on the topic of teaching resource management at the graduate level. The next sections of this article review the apparent failure of resource management to address environmental problems and our efforts to train those pursuing careers in resource management and related fields. We examine social science literature on cooperative institutional arrangements that illustrate principles for sustainable resource management. We then discuss training that seeks to convey these principles where we teach, at Simon Fraser University,

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British Columbia, Canada. The last two sections of the article describe the 'Social Science of Resource Management' course we have offered since 1996 and offer recommendations regarding graduate student teaching and curriculum development in environmental education.

## II. INSTITUTIONAL FAILURE IN RESOURCE MANAGEMENT

Despite Good enough's still-valid principles and practices for deriving public benefits from development-related environmental alterations, barrages of demographic, technological, economic, and political dynamics often limit goods flowing from even careful, creative, and concerted resource management initiatives. It is difficult to dispute Acheson's (2006:118) assertion that

'The world is facing a resource management crisis. Large numbers of marine fisheries have been seriously depleted. Forests are being harvested at unsustainable levels; acid rain and smog are problems in widespread parts of the industrialized world; soil erosion threatens vast areas; parts of Africa and the Middle East are returning to desert; industrial waste dumps make life hazardous for large numbers of humans and other animals; many rivers and estuaries are polluted; and virtually every large lake in the world is in a precarious state.'

Indeed, the Global Environmental Outlook 5 compiled by the United Nation's Environmental Programme (UNEP, 2012b:6) broadens and underscores Acheson's dire observations: 'As human pressures on the Earth System accelerate, several critical global, regional and local thresholds loom or have been exceeded. Once these have been passed, abrupt and possibly irreversible changes to the life-support functions of the planet are likely to occur, with significant adverse implications for human well-being.' Lertzman's (2009:344) conclusion is that if 'avoiding population declines, species loss, erosion of ecosystem services, and degradation of environmental quality in general are the criteria for a successful management system, then modern resource management systems cannot be considered successful.'

Because the causes of environmental problems are diverse, so must be the solutions. Acheson and UNEP agree that developments in systems of collective values, rules and regulations have failed to keep up with the proliferation and intensification of many risk factors. Acheson (2006:128) writes, 'Few generalizations can be made about the reasons humans are unable to manage natural resources, save for the fact that failure is traceable to a lack of willingness or ability to solve collective-action dilemmas to produce effective rules.' The probability of finding ideologically or technologically driven or 'one size fits all' solutions to environmental

problems is low and diminishing. The scale and complexity of many management issues, coupled with widespread perceptions that all modifications to institutions for environmental and resource management result in lost jobs (Canada, 2011), is leading in many jurisdictions to centralized, state- and market-based decision making. Acheson (2006:126) finds reasons to be concerned about this trend, observing that, by 'making it impossible for local governments to experiment in solving problems, top-down management policies stifle learning and curtail adaptive responses to problem solving.'

## III. WHEN AND HOW COOPERATION HAPPENS IN RESOURCE MANAGEMENT

More encouraging news comes from resource management efforts grounded in closely linked social and ecological systems. Our knowledge continues to grow concerning the social, economic, political, and ecological conditions that permit cooperation and other altruistic behavior and institutions to flourish. Dominant Western views of human nature as inevitably competitive and egotistical have been effectively challenged (Keltner, 2009). Counter examples and antidotes to the tragedy of the commons are now well documented (Netting, 1993; Ostrom, 1990; Poteete et al., 2010).

Because common pool resources are problematic to manage in a top-down manner due to excludability and sub tractability issues, social science literature regarding those institutional arrangements that permit cooperation in resource management usually address fish, forests, water, wildlife, rangelands, etc. (Feeney et al., 1990). Cooperating parties usually include the government agency with an official mandate to manage the resource and a local community with historical dependence on an adjacent resource. More complex arrangements involve multiple government agencies and multiple parties claiming rights to access and use the common pool resources.

Since the mid-1980s, findings from anthropology and ecology on the self-regulating capacities of rural communities (Acheson, 1975; Berkes, 1981; Johannes, 1978; McCay and Acheson, 1987; Swezey and Heizer, 1977) have stimulated integrative research by anthropologists, political scientists, economists, ecologists, and planners on the benefits of co-operative power-sharing between self-regulating communities and government agencies (Agrawal, 2002; Armitage et al., 2007; Berkes, 1999; Dyer and Mc Good win, 1994; Feit, 2005; Pinkerton, 1989; Plummer, 2009; Schlager and Ostrom, 1993; Wilson et al. 1994; Pinkerton and Weinstein, 1995;; Wilson et al., 2003). This ever-expanding literature is generating insightful hypotheses about the conditions under which such cooperation is likely to emerge

successfully and to promote sustainability in the use of common pool resources.

Coming to terms with appropriate management strategies involves far more than understanding conditions supporting the creation of cooperative institutions; the nature of both the resource and the community must also be considered. For example, to make investments in cooperative institution-building feasible, the resource must be sufficiently abundant, culturally or economically important, adjacent to the community, or possess other value-enhancing attributes. Similarly, to make cooperation within the community and with government agencies and other parties a likely option, the community must be sufficiently dependent on the resource, have clear membership, strong leadership, sufficient trust, conflict resolution capacity, legitimacy, and shared norms and values about the need for sustainable management. Leaders in successfully cooperating communities can usually articulate a broad, holistic vision regarding sustainability and galvanize the political will of the community to work consistently toward the vision (Agrawal, 2002; Jentoft, 2000; Pinkerton, 2009; Pinkerton and John, 2008; Welch et al. 2011a).

If these permitting resource and community conditions are sufficiently met, cooperative power-sharing institutional arrangements can often be built. In examining what conditions support the resulting cooperation between parties, scholars have emphasized distinct and important roles played by de jure and de facto rights asserted by the community on at least two levels: (1) The community must have strong access rights, as well as sufficient local livelihoods tied to these rights such that it is not tempted to develop livelihoods that would pollute or degrade local the resources. (2) The community has, or is willing to assert, higher-level management rights, such that it can cooperate with government in making decisions not only about collecting data on resource status, interpreting the data, formulating a local harvesting plan based on the data, monitoring and enforcing the plan, monitoring and enforcing habitat protection, but also decisions about allocating rights to particular users within the community, and making higher level policy about what vision guides the lower-level decisions (Above needs literature citations).

In addition to management studies of resource-dependent communities, the literature from the sociology of bureaucracies and the behaviour of organizations is helpful in identifying the characteristics of government agencies which make for effective and cooperative behavior (Bolman and Deal, 1997; Clarke and McCool, 1996; Lane and Stephenson, 2000; Pinkerton, 2007; Scott, 1998; Senge, 1990; Wilson, 1989). The capacity of these agencies to act cooperatively is highly variable. Because many graduate students in resource management end up working in

government agencies and other bureaucracies, research on effective task groups (of 5-7 people) provides an important theoretical and practical locus for understanding cooperation and for first hand experiences via in-class exercises and the group work discussed below. In sum, we now have hundreds of case studies of successful and less successful cooperation in resource management, and such cooperation has been shown to produce resource Management outcomes superior to those resulting from competitive, market-driven and top-down institutional arrangements. Taken together, these cases suggest hypotheses about what conditions favour the emergence of cooperative, shared resource management decision-making and governance.

#### IV. TRANSLATING WHAT WE KNOW ABOUT COOPERATION INTO PEDAGOGY

Given their emphases on regional and global scale governance, it is not surprising that neither UNEP nor Acheson explicitly address academic training for resource managers. Nonetheless, the need for adaptive learning (and managing) is pervasive. Acheson writes, 'To manage resources effectively, we will have to be quite imaginative. We will need to combine various elements of privatization, government control, local control, and managerial techniques. In ways we have not imagined could be done' (Acheson, 2006:129). Similarly, UNEP (2012b:16) emphasizes that, because 'there is no universal solution to environmental degradation, a range of tailored responses is required to reflect the diversity of regional needs. In areas of common global concern, however, coordination, participation and cooperation are critical for jointly meeting internationally agreed goals and targets, while also addressing the capacity deficits.' The UNEP (2012b:16) report provides a more specific recommendation on the need to 'align environmental policy and programmes with sustainable development goals by strengthening education for and raising awareness of sustainability issues.'

From Acheson's and UNEP's dire conclusions and the literature reviewed above, we derive four general recommendations regarding university training in resource management. Higher education should train professionals who are able to (1) engage, learn from, and collaborate with resource users on multiple social and spatial scales; (2) work with resource-dependent communities and governments to craft institutions harmonized to match specific resource-user-situation configurations and meet dynamic management needs; (3) assess the values and costs of their interventions (and non-interventions) in local and regional resource and environmental management and boost local and regional capacities accordingly; and (4) identify and encourage factors affecting successes defined by scale-

appropriate groups of resource stakeholders. We think this list provides a broad curricular template for graduate studies in resource management for the twenty first century, and possibly longer.

But more is needed to integrate and drive such training and to encourage its applications. To this four-part template we suggest a fifth element not addressed by Acheson or UNEP: (5) harness personal, values-based commitments to the protection of environmental integrity. We recognize that resource management is, in the purest sense, a value-neutral suite of related professions, not a preference or system of values. We understand the field of resource management includes managing resource destruction, extraction and mitigation, as well as protection and conservation (Lertzman, 2009). We agree that universities exist to create and mobilize knowledge and skill, not to indoctrinate or promote specific schemes or broad social movements. On the other hand, we agree with most scientists on the need to 'combine technical analysis and effective advocacy to create innovative, practical solutions for a healthy, safe, and sustainable future' (Union of Concerned Scientists, 2013). Our approach is further grounded in the truth that university programs dedicated to environmental training attract students with pre-established personal interests in resource health and sustainability (Arnocky and Stroink, 2011).

In other words, students in environmental management degree programs, especially at graduate levels, have already made a decision to intervene on behalf of the sustainability and resilience of linked social and ecological systems—to manage and thus to lead at macro and micro levels. Given that the success of management intervention depends in part on the attitude or internal state of the intervener (Goodenough, 1963:377; Scharmer, 2007), our teaching recognizes and advances the truth that leadership success in resource management is determined in part by personal commitments, collective visions, and abilities to mobilize toward those visions (Pinkerton, 1998; Welch et al., 2011a). More fundamentally, the powers of personal conviction, undeniable though often unmeasurable, provide a rationale for faculty initiatives to empower students' knowledge and application of this fifth element in their thinking, doing, and learning. The next section examines the academic context in which we are implementing these five recommendations.

## V. SFU AND REM

Simon Fraser University (SFU) is a public university with about 1,000 faculty offering more than 100 undergraduate, graduate and non-degree programs to approximately 32,000 students on campuses in Vancouver, Burnaby and Surrey, Canada. Founded by the province of British Columbia (BC) in 1965 to

accommodate growing regional populations and interests in higher education, SFU soon emerged as a hub for progressive research, training and outreach (Johnston, 2005). In a recent consolidation of this reputation, SFU has adopted a motto of 'engaging the world' and a vision of becoming 'B.C.'s public square for enlightenment and dialogue on key public issues ... the institution to which the community looks for education, discussion and solutions,' including environmental concerns (Petter and Taylor, 2012).

The School of Resource and Environmental Management (REM—pronounced word-like, as in deep REM sleep, rather than spelled out like R.E.M., the band) at SFU is one of Canada's top graduate schools in this growing and diversifying field. REM's 19 faculty members (12 full-and seven part-time in 2014) have expertise ranging from chemistry (environmental toxicology), ecology, and geosciences to economics, law, planning, community-based research, and tourism. This diversity embodies REM's founding philosophy: effective approaches to environmental problems require close attention to complex interactions among socioeconomic and biophysical factors. Detailed information on REM programs, students, and faculty is available at <http://www.rem.sfu.ca/>.

REM's four credential programs foster opportunities for students to learn and apply disciplinary and interdisciplinary training in the context of environmental challenges. Most of the students in the Graduate Diploma in Fisheries Management are resource management practitioners interested in boosting their expertise in computer modelling and related quantitative methods. Students in the other three programs—Ph.D., Masters of Resource Management (MRM) and MRM (Planning)—must complete substantive graduate coursework in three broad domains—environmental science, ecological economics, and environmental policy and social science—as well as an intensive research project. MRM students in the planning stream complete a policy- and planning-focused program of coursework. Unlike most other programs accredited by the Canadian Institute of Planners and counted as members by the Association of Collegiate Schools of Planning, which 'offer environmental planning as an area of specialization at the master's degree level' (White and Mayo, 2005:31), the REM planning program's entire emphasis is on multi-scale environmental planning and policy concerns.

The two masters-level programs, MRM and MRM (Planning), account for about ninety percent of REM's students, with more than 500 degrees awarded since REM was established at SFU in 1979. Our MRM program is an academic-professional hybrid. Students come to the program with varied cultural, educational and experiential backgrounds. Most have undergraduate degrees in biology, geography, environmental studies, political science, economics,

anthropology, or allied fields. All arrive to prepare for careers in governmental and non-governmental organizations and to boost research aptitudes. Table 1 lists the six required courses as well as the nine categories of elective courses available to graduate students. SFU undergraduate students increasingly have access to courses taught by REM faculty and faculty affiliates, including courses in fisheries and forest ecology, energy systems, risk assessment, and

ecological economics. Many MRM students elect to participate in the optional Cooperative Education Program to complement research and classroom activities through short-term employment with a public, private or aboriginal organization concerned with resource management. Students close out their MRM and MRM (Planning) program requirements with the completion and juried defense of a thesis-like report on their capstone research project.

Table 1: Required and elective coursework for the SFU Masters of Resource Management degree

<p>Six 'core,' classroom-based courses</p> <ol style="list-style-type: none"> <li>1. Social Science of Natural Resources Management</li> <li>2. Applied Population and Community Ecology</li> <li>3. Ecological Economics</li> <li>4. Earth Systems and Global Change in Environmental Management</li> <li>5. Regional Planning or Public Policy Analysis and Administration</li> <li>6. Principles of Research Methods and Design in Resource and Environmental Management</li> </ol>	<p>Nine types of elective courses</p> <ol style="list-style-type: none"> <li>A. Community and regional planning</li> <li>B. Co-management and institutional design</li> <li>C. Ecological risk assessment</li> <li>D. Fisheries and water management</li> <li>E. Sustainable energy systems</li> <li>F. Population and conservation ecology</li> <li>G. Outdoor recreation and parks planning</li> <li>H. Tourism planning and development</li> <li>I. Environmental law, policy and regulation</li> </ol>
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The MRM program is cohort-based and features two years of requirements. First-year students are introduced to the program, to critical issues in resource management, and to one another and REM group work through an intensive, week-long field trip through southern British Columbia. Classes commence the following week, and most first-year students take at least two of the six required 'core' courses as well as at least one of their six electives in their first term. Students are typically resident for two fall terms and two spring terms of coursework—a total of four trimesters. Most students dedicate summer terms to fieldwork, internships relating to their capstone research projects, or other professional activities connected to career plans.

of-summer field trip for the incoming student cohort and in counterbalancing biophysical and economic approaches to resource management that emerge as central in most student's research projects, REM 601 is the only required course for which MRM students are not generally granted waivers based on prior course work. In other words, in terms of both our MRM program and individual student preparation, our faculty sees REM 601 as a unique and essential course for our MRM and MRM (Planning) students.

We have each taught the course at least seven times since 1996. In the later 1990s, Pinkerton redirected REM 601's focus from a history of thinking on environmental issues to insights gained through research on fisheries and forest co-management in Western Canada (especially see Pinkerton, 1998, 2007, 2009; Pinkerton et al., 2008). Welch's experience provided a complementary basis for expanding the course emphases to include cultural resource issues and collaborations with indigenous communities (see Welch, 2000, Welch et al., 2009). Continuous coordinated teaching of REM 601 has allowed us to refine course process and learning objectives in response to student feedback and our own and others' evolving research and teaching experiences. A webpage maintained by the SFU library lists publications, websites, and other materials relating to REM 601 themes (Welch and Tripp, 2011).

## VI. APPRECIATIVE INSTRUCTION IN RESOURCE MANAGEMENT: COURSE GOALS AND PROCESSES

Social Science of Natural Resources Management, listed as REM 601 in the SFU course calendar, is required for all MRM candidates. Subtitled 'Theories of Cooperation,' REM 601 is taught each fall as a 13-week course (four hours of class meetings per week). The course is designed and implemented to build MRM students' conceptual vocabularies and practical skills for understanding the social dimensions of resource management and the individual and group factors that often determine management success. The official description of the course states that the course is, 'An introduction to the relevance of social science perspectives, data and analytical tools in resource management, especially as these complement, supplement or critique perspectives from natural science or economics.' Because of its pivotal roles in extending the esprit du corps fostered during the end-

### a) Cooperation vs. conflict

Our application of appreciative inquiry has led to a course emphasis on conceptual and practical means for encouraging cooperation and creativity in pursuit of futures that are just, sustainable, resilient, adaptive and desired (Good enough 1963). All human interaction may be viewed on a continuum defined at the Poles by conflict and collaboration (see Colwell-



Chanthaphonh and Ferguson, 2008; Welch et al., 2011b). Although most forms of both conflict and collaboration entail cooperation and can foster solidarity, conflict is defined by differences—of opinions, preferences, values, etc.—while cooperation is defined by common ground. Behind every conflict is a contest over whether and how much to change. Conflict carries and often incubates seeds for fractionating social and political capital. In this sense, conflict sets high or neutral discount rates on amorphous and uncertain futures. In contrast, cooperation founded in shared interests and pursued through good faith, even if focused on small goals, tends to expand commonalities, reward virtuous behavior, multiply social learning and social capital, and assign low discount rates to mutually desired futures (Wals, 2007). The main point, however naïve it may seem, is that the proactive pursuit of consensus goals using constructive, context-sensitive inquiries and applications are more likely to be satisfying and successful than reactive and divisive quests. It is easier to build coalitions in campaigns 'for' than 'against.' Even in computer simulations of decision making in contentious arenas, 'yes' is more potent than 'no' (Axelrod, 1984).

Contrary to prevailing beliefs in Western culture that selfishness and aggression are innate and harsh conflict inevitable, there is evidence that altruism is at least as instinctual as egotism (Keltner 2009) and that human 'nature' and human values, behavior, culture and institutions are highly malleable (Flores et al., 2012). There are viable alternatives to violence and many options for conflict resolution (Burton 1998). Conflict types, levels and meanings vary by cultural and social setting, with some societies expressing few inclinations toward domination or violence. It is no coincidence that many less authoritarian institutional forms are land-linked and that many social groups defined by cohabitation with human and non-human neighbors have been extinguished or 'radicalized' through colonial encounters (Scott 1990, 1998, 2012). Such encounters—the coercive and commoditizing influences of capitalist expansionism and the creativity of Indigenous responses thereto—are among Welch's research foci (see, for example, Welch, 2008; Welch et al., 2010; Welch et al., 2011a, b). Pinkerton's work centers on how cooperation offers a low-cost, egalitarian, and benefit-sharing way of solving common pool resource management problems, in contrast to the high-cost, privatized, individual rationality with few beneficiaries offered by neoliberalism (Pinkerton and Edwards, 2009; Pinkerton, 2013). (Last two sentences, or even entire Para., would probably not be missed)

The realities that personality, culture, land, technology, and social context shape how people perceive, evaluate and choose how to deal with conflict occupies center stage when people come together from different ethnic, religious, racial, economic, disciplinary

or organizational backgrounds. All or most supra-household cooperation involving resource and environmental management involves more than one set of values, norms, and preferences. Studying how and under what conditions people cooperate in diverse interpersonal, cultural and institutional settings helps to relieve students of ego- and ethno-centric convictions, expand their repertoires of alternative responses to conflict, and guide them through collective learning and, perhaps, toward appreciation for cooperation.

#### b) *Modelling cooperation through course process*

The primary complement to the REM 601 keystone principle that cooperation is the single most indispensable ingredient in successful resource management is the oft-repeated dictum (attributed to Einstein) that 'Example isn't another way to teach, it is the only way to teach.' We embed this pedagogic precept in both course processes and assignments. As is true for many social science courses, students are called upon to learn a suite of subject matter concepts central to each of the three main REM 601 course modules (Table 2). We employ many of the course concepts in this paper to illustrate both the trans-disciplinary importance of the concepts and the merits of teaching by example.

In lieu of examinations or standard research papers, we ask students to demonstrate mastery of course concepts through creative written explorations of situations in which suites of concepts are embedded and unleashed. Student papers use diverse literary forms (e.g., creative fiction and non-fiction, poetry, screenplays, etc.) and narrative contexts (e.g., travelogues, monologues, dialogues, parodies of popular songs, meeting transcripts, etc.) to bring the concepts to life in compelling situations. Many successful papers build upon specific characteristics of a common pool resource (e.g., a particular fishery, game species, forest, variety of native plant) and explore challenges stemming from the (over)use, degradation, and industrial management of these resources in distinctive contexts. Papers are graded on the basis of both breadth in the number of concepts engaged and depth in concept interplay and integration, as reflected in the details of the narrative scenarios. Some successful papers have used doggerel and parodies of popular song lyrics to describe actual solutions to real-world resource management problems. Others have devised emphatically fictional worlds in which unique forms of resource conflicts give rise to novel forms of cooperation and management.

Table 2: Central course concepts for the three REM 601 modules

PAPER 1	PAPER 2	PAPER 3
Common pool resources (CPRs) are subtractable CPRs are rivalrous and difficult to exclude (ab)users Tragedy of Commons Game theory  Prisoner's Dilemma Tit-for-tat strategy  Repeat/continued interaction (fosters cooperation) Egotists Cultural factors influence economic behaviour Limits of rational choice theory  Institution vs. Organization  Transaction costs Social capital  Human capital Physical capital  Values driving market vs. state vs. community institutions De jure vs. de facto rules Free-riding Efficient vs. effective Discount rate Perverse incentive  Constitutional, operational, and collective choice rules Path dependence Scale-appropriate adaptive governance	TEK/ LK vs. science  Pattern thought  Individual vs. group welfare Realism vs. constructivism  Process vs. outcomes Dialogue  How children learn  Solidarity Ideologically driven rule making or enforcement Middle-range theory vs. grand theory vs. case studies Property rights → more property rights → better CPR management Tiered management rights Individual vs. group rights  Trust → social capital → civil society Nested enterprises  Ideology influences economy  80/20 Rule Neo-classical CPR management Institutional CPR management Cultural ecology CPR management Features of successful community management Features of sustainably managed, community-based fisheries Accountability mechanisms	Characteristics of effective management leadership Communal vs. private tenure  Elements of human-land connectivity Harmonized resource and management scales Cadastralization Bureaucratic vs. ecosystem rationalities Science vs. 'non-science' emphasis in management culture Multi-disciplinary vs. interdisciplinary Organizational legitimacy  Top-down vs. bottom-up management  Countervailing and triadic power  Captured agency Characteristics of effective organizations Single- vs. double-loop learning Structural, human resource, political, and symbolic management frames Behavioural biases of bureaucracies  Micro-level leadership Citizen science Community-based management Adaptive management Servant leadership  Managing in, up, out, through  Reframing: structural, political, human resources, symbolic

In much the same way that the three paper assignments oblige students to find or fabricate examples of course concepts, the persistent work groups engage students in the real-time, real-people collaborations (and conflicts) in pursuit of course objectives (Table 3). As our colleague David Schaepe quipped, 'Resource management is social science; we do it in groups.' Course assignments oblige students to work together to manage course processes and products as well as interpersonal dynamics. The longstanding design principles for these cooperative learning groups closely resemble the 'keys to successful group processes' identified on the basis of recent empirical studies designed to optimize the effectiveness of cooperative learning (Shimazoe and Aldrich, 2010:53). The REM 601 principles include unimpeded access to information, transparent rule systems, practical training in process skills, compositional balance within and among peer groups, use of peer

feedback, and instructor responsiveness to individual and group needs and interests.

Implementation of these principles begins on the first day of class and continues through the term. We divide student participants into four-five work groups, each with five-seven students. If random assignment of students to work groups fails to balance representation of genders and Keirseley Temperament Sorter (Keirseley, 1998) characteristics less common among REM students—i.e., preferences for introversion (over extroversion), sensing (over conceptualizing), and feeling (over thinking) in information processing—then group membership is rearranged. MRM cohorts are generally dominated by three of the four clusters of Keirseley types: Guardians, Idealists, and Rationals (only a few Artisans through the years). Thus balanced, the groups are promptly assigned five sets of tasks designed to be more effectively completed in cooperation with other group members (Table 3).



Table 3: Small group assignments, suggested steps to completion, and task-level learning objectives

Group Tasks	Recommended Process Elements	Intended Learning
Questions on assigned readings (18 sets of questions)	<ul style="list-style-type: none"> <li>• Pre-class reading by all students</li> <li>• In-class group deliberating</li> <li>• In-class responding</li> <li>• After-class posting of written response to course Dropbox™</li> </ul>	<ul style="list-style-type: none"> <li>• Reading focused on specific questions and group interests</li> <li>• Listening to group peers</li> <li>• Speaking to class peers</li> <li>• Negotiating workloads</li> </ul>
Cooperative learning exercises (4-6 training opportunities in the initial two-thirds of course)	<ul style="list-style-type: none"> <li>• Direct experience of selected course concepts</li> <li>• Visual-auditory-kinesthetic involvement in teaching and learning</li> <li>• Participation in and observation of group process</li> <li>• Discussion and feedback on exercise design and implementation</li> </ul>	<ul style="list-style-type: none"> <li>• Knowing personal temperaments and preferences for dealing with conflicts</li> <li>• Communicating across social boundaries</li> <li>• Listening actively</li> <li>• Discovering and harnessing group preferences, identity</li> </ul>
Group Report (35 minute presentation in week 10)	<ul style="list-style-type: none"> <li>• Identifying and analyzing operation of course concepts in real world</li> <li>• Producing and delivering multi-media presentation</li> </ul>	Peer and instructor feedback criteria: <ul style="list-style-type: none"> <li>• Course concept presentation</li> <li>• Concept linking, integrating, assimilating, extending</li> <li>• Deployment of member attributes</li> <li>• Presentation originality, creativity, effectiveness</li> <li>• Audience engagement</li> </ul>
Group Process Report (20-minute presentation in week 12)	<ul style="list-style-type: none"> <li>• Considering individual temperaments and conflict management styles</li> <li>• Reviewing passive and active management of group process</li> <li>• Analyzing effects of key modes and episodes in group process</li> </ul>	<ul style="list-style-type: none"> <li>• Identify group challenges and opportunities</li> <li>• Portray dynamics affecting collective and individual learning and team building</li> </ul>
Peer Feedback (ongoing, then formalized in week 11 for inclusion in course mark)	<ul style="list-style-type: none"> <li>• Assessing role(s) played by each team member in relation to others</li> <li>• Specifying links among role(s) played and group effectiveness</li> <li>• Assuring justice and parity in provision of quantitative and qualitative feedback</li> <li>• Balancing compassionate thoughtfulness and critical rigor</li> </ul>	Peer feedback criteria: <ul style="list-style-type: none"> <li>• Logistics– attendance, punctuality, participation</li> <li>• Substance– preparedness, contributions to course material synthesis, analysis, and group report form, content, and presentation</li> <li>• Process– enthusiasm, facilitation, feedback, promotion of learning</li> </ul>

When coupled with peer feedback, intensive group work obliges members to determine how small groups can deploy member knowledge and temperaments to their collective advantage. Each group is self-regulating and each is encouraged, through various course structures and exercises, to develop and deploy capacities for collective learning and acting in pursuit of shared goals. As is true for all interpersonal process, good communication is essential. To this end, the second week of the course features a 'blind construction game' in which two students are given identical sets of wooden building blocks and asked to take turns playing roles of dictator-engineer and listener-builder. Screened from one another, with the listener-builder unable to ask questions or take visual clues, the first round of the game tends to instruct participants and observers in the importance of precise and empathetic communication. With the roles reversed, the second round tends to feature lessons in how team members quickly learn from situations and one another to perform at higher levels. This experience creates capacities to

recognize that the prisoner's dilemma and tragedy of the commons (in which actors cannot or do not communicate with each other and therefore act only in their individual self-interest)—although all too common in resource management situations and literature—can be overcome by appropriate communication.

The following week includes an exercise intended to help students identify deeply personal values and preferences, some of which correlate strongly with Keirsey Temperaments. Inspired by Mary Douglas' (1986) book *How Institutions Think*, the cannibal-cave dilemma workshop empanels 601 students as an appeals court jury to decide the fate of a group of spelunkers Who, cut off from the outside world, decided by throwing dice which one would surrender his flesh so the others would live. In addition to the profound existential questions relating to individual and collective welfare, the jury deliberations tend to differentiate students from one another depending on whether their judgment of the surviving cannibals centers on (a) formal law; (b) contract they forged prior

to throwing dice, or (c) collective welfare, including those above the ground. The workshop highlights the roles of these respective value judgments as origins and drivers in forming and reforming State, Market, and Communal institutional formations. The exercise obliges students to situate themselves as sources of and actors in the inherently social process of making and enforcing rules, including environmental regulations on various scales.

We discuss two more course exercises to illustrate our commitments to building collective capacities for cooperative learning and acting, explicitly including substantive and consequential feedback. In weeks four or five, we ask the groups to devise, within basic parameters of active listening principles (i.e., physical orientation to hearing, paraphrasing, reflecting, clarifying, encouraging), processes and topics for an experiment in deepening their knowledge of group members and how to listen to one another. We encourage group members to take turns sharing, listening, observing the qualities of attention paid, and in the first of many feedback exercises, offering constructive suggestions on what would enhance and expand communications for both speakers and listeners. By week six we expect that the exercises, the group responses to questions on the readings, or some combination will have fostered interests and capacities for group management. At this point, as the middle of the term nears, we ask the groups to describe formal and informal rules that are emerging for conducting group discussions, assuring all group member views are heard and considered, reaching decisions, and providing feedback to optimize group participation and effectiveness. This assignment is delivered via an invitation to create a name, flag, credo, and system of rules—constitutional, collective choice, and operational—for a new 'nation' made up of the group members. We further suggest that the rules be tailored to support group members in managing ministerial portfolios to assure excellence in national self-sufficiency, self-governance, and reciprocal external relations. The results typically feature a combination of creative, comic, and customized arrangements that reveal developing insight into the complexities of self-directed team-building. As the groups accumulate direct experience with many course concepts, they emerge as microcosms for many common situations in actual resource and environmental management processes and organizations.

In-class workshops and group exercises notwithstanding, the demands and benefits of the group work are often elusive to students prior to their engagement with the Group Report. The intense collaboration required to plan and implement a research-based, teaching-focused analysis of an important topic in real-world resource and environmental management can be both exhilarating and vexing.

Latent conflicts—even minor differences in preferences concerning the timing, location, and formality of meetings and task assignments—often bubble to the surface in the creative crucible of report preparation. These conflicts, many of which seem trivial yet have implications for group effectiveness are ideal proving grounds for group engagement with peer feedback.

The Group Process Reports, presented at least one full week after the completion of the Group Reports, provide members with an incentive to reflect in some detail on how their group formed, functioned, identified and addressed conflict, and performed under pressures defined by end-of-term workloads and audience anticipation. The purpose of the Group Process Reports is not to evaluate the 'hand' that each group was dealt in the REM 601 game, but how the hand was played—how the group applied course concepts and deployed its diverse members and other 'resources' to maximum advantage. The class at large and the instructors evaluate Group Process Reports based on the quality and candidness of the group's self-analyses. The provision in REM 601 for each member of each group to anonymously offer constructive written feedback as well as quantitative assessments of their peers helps to ensure students' careful attention to course process in general and group work in particular.

The cohort structure of the MRM program makes it inevitable that students will be future classmates, and often members of the same small work or task groups. This means REM students tend to assign low discount rates to future peer interactions and to take seriously their obligations to one another. We have found that REM 601 in general, and the 601 work groups in particular, provide exceptional contexts for bonding at group and cohort levels. Most students enter 601 with knowledge of one another based only on REM 698, the week-long, field-based introduction to resource and environmental management delivered immediately before the start of the fall teaching term. Upon exiting 601, most students commence closer associations with their respective, faculty-led research groups and their thesis-like research projects. The personal relationships fostered and professional capacities cultivated in REM 601 cut across and, importantly, precede barriers that naturally take shape as students' MRM programs and post-REM careers unfold. Anecdotes abound regarding the power and persistence of the bonding experience that is one of 601's most important, yet difficult-to-specify learning outcomes. One 2011 small group comes together to share a meal at least once a year. A 2009 team persists as a Face book™ group. As one former student said, '601 catalyzed our awareness of how lucky we were to be working together.' (Here and elsewhere, need to extract evidence from course feedback forms and other sources).



## VII. DISCUSSION: APPRECIATIVE, EXPERIENTIAL, AND COLLABORATIVE-TRANSFORMATIONAL LEARNING

It would be useful to learn whether a similar emphasis on cooperation was effective in a non-cohort graduate program, but it has been useful in the REM MRM. Students routinely rate the course in the 'A' range and reports regularly reach us concerning the beneficial effects on student comprehension of resource and environmental management as an emphatically sociocultural process, albeit one that addresses issues and elements in the biophysical world.

We have designed and delivered REM 601 to help dismantle outmoded divisions between teaching and research, teaching and learning, and classroom and experiential education (Hutchings et al., 2011). REM 601 is, in part, an experiment in on-campus emulation of experiential education and student-centered learning (Rogers et al., 2013; Till et al., 2011). If experiential education is defined as the co-creation, with students, of opportunities to learn through exposure to, engagement with and reflection on activities designed to require applications of theories and concepts to practical matters, REM 601 qualifies. This definition allows for the inclusion of classroom-based learning as long as activities are systematically embedded in learning opportunities. More specifically, REM 601 qualifies as experiential because students are obliged to reflect on and integrate course content into their lived experiences. This integration occurs through role playing, group work, small group and plenary dialogues, the three creative papers, the Group Process Report, the peer and course feedback, and, after the term, in their varied careers. These processes situate individual students and student groups within course contexts and contents, thereby prompting student questions about relationships among these elements.

REM 601 encourages students to develop analytic skills and other social science tools for application to diverse issues in resource management. REM 601 students know when and how to apply the course concepts, when to ask additional questions, and where to find additional tools. Our course provides participants with opportunities to engage ideas and practices for harmonizing diverse and divergent interests in resource and environmental management contexts. In REM 601, students learn to recognize key differences in market, state, and community institutional frameworks for resource management and to assess situations in which each framework may be useful and other circumstances in which hybrids may lead to reciprocally beneficial outcomes. They are able to see and describe how cultural factors influence behavior, including economic behavior, and the limits of rational choice theory. They can apply elements of effective

organizational leadership and model the characteristics of organizations capable of learning and changing what it does in response to what it has learned. Finally, REM 601 students are able to apply institutional design and decision-making principles that take social, cultural, economic, and political factors into account, and promote sustainable outcomes. They understand, on the basis of first-hand experience, how cooperation can develop, thrive and be harnessed in creative and satisfying initiatives that improve the conservation of common pool resources—including time—in the context of a 13-week course.

## VIII. CONCLUSIONS

Environmental problems, including the institutional failure of resource management, are not likely to be solved by the replication of disciplinary focus and independent individual learning and acting (Moslemi et al. 2009; Wagner et al. 2012; Zurayk et al. 2010). The escalating values of 'stakes' in environmental decision making are boosting potentials for both conflict and its generally more constructive flip side, cooperation. Contrary to prevailing beliefs in Western culture—i.e., that aggressively asserted self-interest is innate and conflict inevitable—there are viable alternatives to violence and many routes to altruism. Research into factors and theories of cooperation and into managing relations between human communities and ecosystems has blossomed in recent decades, yet few published works delve into the important topic of how these research advances may be conveyed to students and resource management practitioners. Graduate students in particular need and deserve exposure to resource management crucibles involving the disparate ingredients of multiple participants, the pressure of short time frames, and the heat of divergent interests. We seek to prepare participants to enter such crucibles equipped not only with scholarly, second-hand familiarity with the factors that enable cooperation in resource management, but with at least a modicum of conscious first-hand experience in the effective management of conflict to achieve collectively desired futures. 601 students have the opportunity to examine both specific contextualized cases to understand their workings, and also develop a general grasp of how to judge whether any particular situation offers favourable conditions for the development of cooperative management. As future managers, they acquire tools to know the difference between a good bet and a poor prospect.

Finally, we think the privileges that accompany professorship—especially freedom of association, learning and expression—come with responsibilities to think and act beyond self-interest (Moore, 2005:326). As environmental educators, this responsibility translates into ethical mandates to do what we can to mitigate the

losses to ecosystems services through multi-scale research and action to identify biophysical and cultural heritage to be carried forward and how best to do so.

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